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**RIGHTSLINK****Color quantization and processing by Fibonacci latti**

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**Abstract:**

Color quantization is sampling of three-dimensional (3-D) color spaces (such as Lab) which results in a discrete subset of colors known as a color codebook or is extensively used for display, transfer, and storage of natural images in Internet applications, computer graphics, and animation. We propose a sampling scheme provides a uniform quantization of the Lab space. The idea is based on several results from number theory and phyllotaxy. The sampling algorithm is very much systematic and allows easy design of universal (image-independent) color codebooks for a given set of parameters. The codebook structure allows fast quantization and ordered dithering of images. The display quality of images quantized by the proposed color codebook is comparable with that of image-dependent quantizers. Most importantly, the quantized images are more amenable to the type of processing used for grayscale ones. The processing for grayscale images cannot be simply extended to color images but relies on the fact that each gray-level is described by a single number and the 1-D relation of full order can be easily established on the set of those numbers. Color spaces (such as RGB or Lab) are, on the other hand, 3-D. The proposed color quantization and color space sampling and numbering of sampled points, makes methods for processing grayscale images extendible to color images. We illustrate possible processing of images by first introducing the basic average and difference operations and then implementing edge detection and compression of color quantized images.

**Index Terms:**[edge detection](#) [image coding](#) [image colour analysis](#) [image sampling](#) [lattice theory](#)

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